

15th


\$5.50 A YEAR

February 11, 1956

VOL. 69, NO. 4 PAGES 81-96

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Mutated Snapdragon

See Page 88

A SCIENCE SERVICE PUBLICATION

Kodak reports to laboratories on:

making one's point vividly in a learned journal . . . some information we hope you'll use and some we hope you won't

Cut-rate color

A beautiful photograph of *Castilleja linearifolia* in full color might have been printed in this space.

But this magazine doesn't print full color. It is too costly for the economic structure that supports the publication. One needs a set of four printing plates—magenta (known to printers as "red"), cyan (known to printers as "blue"), yellow, and black. Much costlier paper would be needed, and it must go through a press four times under most exacting conditions of register and inking.

A certain national wildflower society we know has a beautiful color transparency of *Castilleja linearifolia* to reproduce in its bulletin, but such an expenditure would immediately chew up its publication budget. The figures have scared off many other societies and publishers of periodicals and books aimed at smallish audiences.

Very well, we have devised a cut-rate color printing method. It is intended for press runs of not much more than 2500 copies. It dispenses with the black plate, depending on overprinted heavy inking for rendering dark areas. It permits none of the laborious hand work that's back of the exquisite effects achieved in some color advertisements and none of the color correction by electronic computing circuitry, used for editorial color illustrations in some mass magazines. It would hold down the soaring flight of an advertising art director's creative imagination.

But, by George, it's color printing, and it might be just the ticket for the scientist with a few Kodachrome or Ektachrome slides that drive home the whole point he wants to make.

Matter of fact, it was him we developed the process for.

Eastman Kodak Company, Graphic Reproduction Division, Rochester 4, N. Y., can supply the names of some printers who know all about the "3-color short-run" process.

Data for the times

As a kind of public service, we feel we ought to print the table below. We have three reasons for printing it, in decreasing order of importance.

1) In the event of nuclear disaster, pieces of film that survive lighttight might serve as fortuitous dosimeters. Few American population centers of 10,000 souls or more wouldn't contain at least a box or two of such a popular product as *Kodak Royal Pan Film*. Giving it the above-indicated processing normally recommended for that film would provide a radiological survey party with a quick and rough estimate of the amount of prompt radiation that hit where the film was stored. The table neglects the possibility of solarization, but perhaps this is an excessively lugubrious thought.

2) In these nuclear times, the

question often arises of how much radiation it takes to spoil film for its intended purpose. Here is a guide to tolerance judgments, since the sensitivity of a particular photographic material is essentially the same for all radiations harder than 1,000-kvp x-rays.

3) It's an excuse to tick off a few film names you might like to know about. No. 2 is one of the main threads for Hollywood's loom of glamour and glory. No. 3 is sheet film with good tone rendition for monochrome subjects, slow enough for processing by inspection under a relatively bright Series 1 Safelight. No. 4 is the basic sheet film for black-and-white photomicrography. No. 5 has sensitivity out to nearly 10,000 Å and comes in widths up to 9½" and lengths up to 390 feet. No. 6 is 16mm and 35mm film for recording repetitive patterns from green-emitting c-r tubes, unaffected by reddish cathode glow. No. 7 is the world's No. 1 film for aerial photography. No. 8 is a sheet film that gives either inky blackness or diaphanous clarity and nothing much between. And No. 9 provides 16mm or 35mm sanctuary for records by the billions.

KODAK FILM	Kodak Developer	Time (min.)	1,000-KVP X-rays— Roentgens for density of		
			0.3 net	1.0 gross	2.0 gross
1. Kodak Royal Pan Film	DK-60a	4	1.2	13.2	440
2. Eastman Plus-X Panchromatic Negative Film	D-76	8	3.7	19	430
3. Kodak Commercial Film	DK-50	3	4.3	47	305
4. Kodak Contrast Process Panchromatic Film	D-11	3	11.5	36	98
5. Kodak Infrared Aerographic Film	D-19	9.6	1.2	4.0	18
6. Kodak Linagraph Ortho Film	D-19	7	1.1	3.2	12
7. Kodak Super-XX Aerographic Film	D-19	9.6	1.2	3.8	17
8. Kodalith Ortho Film, Type 2	Kodalith	2.25	—	1400	1700
9. Recordak Micro-Film Panchromatic Film	Kedagraph	5	90	220	560

For more detailed information on the radiation sensitivity of more Kodak films, write Eastman Kodak Company, X-ray Division, Rochester 4, N. Y., who hope that the only film ever given an opportunity to soak up roentgens will be Kodak X-ray Film.

This is one of a series of reports on the many products and services with which the Eastman Kodak Company and its divisions are . . . serving laboratories everywhere

Kodak
TRADE MARK

GEOPHYSICS

First Satellite's Orbit

United States announces its first man-made moonlet will be hurled from Florida into an elliptical orbit straddling the equator from 200 to 800 miles above the earth.

► **MAN'S FIRST SATELLITE** will circle the earth over a belt within about 2,500 miles on either side of the equator, scientists in the United States directing the program have decided.

It will be launched from Patrick Air Force Base on Florida's east coast at Cape Canaveral, and a three-stage rocket will boost the moonlet into its globe-girdling path. Dr. Joseph Kaplan has announced. Dr. Kaplan is chairman of the U. S. National Committee for an International Geophysical Year, or IGY.

He revealed details on experiments to be performed with the first satellites in a letter to Prof. Sydney Chapman, chairman of the Comité Spécial de l'Année Géophysique Internationale, or CSAGI, the international body concerned with technical coordination of the world-wide IGY.

A three-stage rocket assembly will hurl the satellite into its orbit straddling the equator.

The first stage, providing a thrust of 27,000 pounds, will start the system on its flight. When fuel is exhausted some 40 miles into the atmosphere and within about two minutes after take-off, the system will have a velocity of 3,000 to 4,000 miles per hour.

A second rocket will boost the satellite to a velocity of about 11,000 miles per hour, burning out at about 130 miles altitude and coasting onward.

When the system has reached an altitude of about 300 miles, the last rocket will speed the satellite into its orbit at about 18,000 miles per hour.

This orbit will cover a belt approximately 40 degrees on each side of the equator to permit observations of the satellite by as many nations as possible.

As the satellite revolves about the earth once every hour and a half, the earth will rotate beneath it. Since the earth rotates on its axis once every 24 hours, it will have made about one-sixteenth of a revolution each time the satellite circles once completely.

Since the satellite's orbit is elliptical, more than one-sixteenth of a revolution will be made by the earth during one revolution of the satellite, and the displacement westward will be about 25 degrees.

Radio observations will extend the possibilities of satellite observations even in its present latitude range. The United States plans to have radio observatories, in addition to optical stations, to track and study the satellite. A transmitter will be placed in the satellite. The probable maximum range of its signals is expected to be be-

tween approximately 1,000 and 3,000 miles in all directions, depending upon the altitude of the satellite, about 200 miles at its nearest point to the earth and about 800 miles at its farthest.

Visual observations will also be possible, both with the unaided eye under optimum conditions and, preferably, with binoculars. A small telescope can also be used.

For practical purposes, under good atmospheric conditions, the unaided eye, when the satellite has an altitude of 200 miles, will be able to detect it at about a maximum distance of 100 miles away from the track, and about 200 miles away from the track at altitudes between 600 and 800 miles.

With good seeing conditions, an observer beneath the path of the satellite will be able to see it, theoretically, as it zooms from horizon to horizon in from eight to 12 minutes.

The first satellite will be spherical in shape, about 30 inches in diameter, and will weigh approximately 21.5 pounds. Of this weight, about half will be the struc-

ture, about half instrumentation, including telemetering systems.

Eight experiments to be undertaken include determining air density and composition of the earth's crust; geodetic measurements; temperature and pressure measurements; meteoritic observations; studies of extreme ultraviolet radiation from the sun, and charting intensities of cosmic rays. Other experiments are planned for later satellites.

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GENERAL SCIENCE

Medical Association Doubles Fair Awards

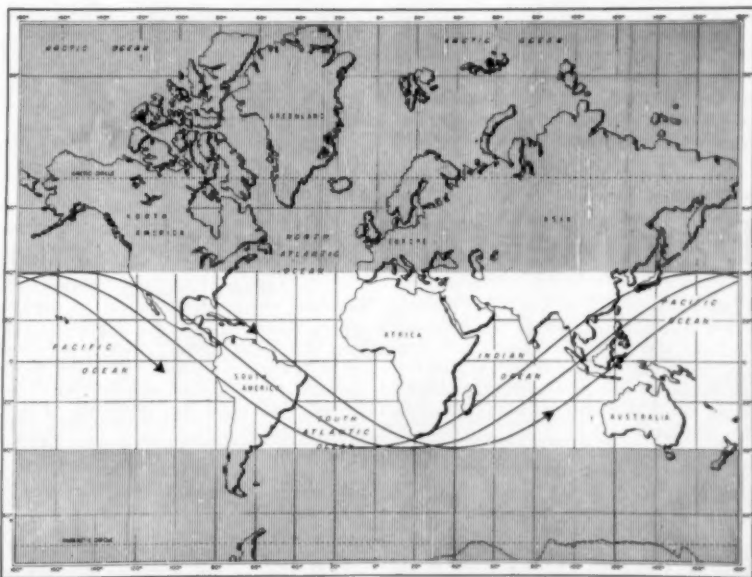
► **RECOGNITION** by the American Medical Association of the work of high school students in science fairs has been doubled.

The A.M.A. has announced that two citations, instead of one as previously arranged, will be awarded to top exhibits in medical research, general health, and physical fitness at the National Science Fair to be held in Oklahoma City, Okla., May 10 to 12.

The two winners in the medical field will be invited to display their exhibits at the A.M.A. annual meeting in Chicago in June. (See SNL, Jan. 14, p. 18.)

The A.M.A. has asked its constituent state and county societies to sponsor local or regional science fairs, from which finalists may be sent to the national fair.

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SPOTTING SATELLITE—How the first few revolutions of the satellite through space might appear if its path were projected onto the earth is shown in this diagram. The 25-degree westward displacement after each revolution results from the satellite's elliptical path and the earth's turning. White belt marks limits of visibility on either side of equator.

GENERAL SCIENCE

Peaceful Atom's Impact

► THE IMPACT of the peaceful uses of atomic energy will in no way rival the immediate and shocking impact of the wartime uses of atomic energy.

It may well be another generation before the average citizen finds himself using atomic energy as an everyday commodity. Much will depend on the citizen himself, who must still accept atomic energy and feel comfortable in a world made better by its use.

This was evident in the conclusions of the first comprehensive study of the peaceful uses of atomic energy made by a non-partisan, nine-man panel and reported to the Joint Congressional Committee on Atomic Energy.

Much of the development of atomic energy for peaceful use, the panel found, is still in a transition stage between complete domination by the Government and a sharing of the development by private interests and Government.

In several areas, the report states, atomic energy will not be able to compete economically with other forms of energy now being used. In other areas, atomic energy will be just another tool for getting things done.

Atomic-powered cars, trucks and buses, for example, are not technically feasible. Atomic-powered planes, ships and locomotives, although possible, will not compete favorably economically for many years to come.

"Peaceful uses of atomic energy in the field of agriculture are significant additions to the many other modern methods of improving farm technology," the panel said.

"Radiation preservation of food does not appear likely to replace other methods of

food preservation to any substantial extent in the foreseeable future."

It is apparent from the report that everyday life will not be changed radically and overnight. Much research and development has to come, but there are two stumbling blocks that can seriously hamper the development of atomic energy: lack of manpower and lack of information.

Discussing the manpower shortage, the report notes that "regardless of how the Federal Government and its departments and agencies resolve all the factors for and against rapid development," manpower is the one factor that may very well determine the overall rate of peaceful atomic development.

An equally strong warning concerning an "informed public" was issued in the report.

"Until there is a better informed public opinion, until there is more balance in programming what lies ahead and until there is integrated policy to guide both our domestic development and our participation in international development of peaceful uses of atomic energy compatible with international atomic control, attitudes and climate alike are apt to shift from day to day and week to week."

Perhaps the most significant and immediate impact the peaceful use of atomic energy can have for Americans is its impact for peace.

The nine-man panel of experts strongly urged U. S. participation in the international development of atomic energy and stated, "atomic power may be the most tangible symbol of America's will to peace through the peaceful atom."

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hospital, or it becomes impractical for them to come every day and return every evening.

When patients living at great distances are treated in day hospitals, they have to live in nearby hotels or boarding homes, which may give them too many situations to adjust to.

The day hospital at Allan Memorial Institute was shown to a group of science writers touring mental hospitals. (See p. 89 for related story.)

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PSYCHIATRY

Day Mental Hospital

► A HOSPITAL for mental patients, which has no iron bars at the windows, no locks and keys and scarcely any beds, has been operating successfully in Montreal for almost 10 years. It is the day hospital of the Allan Memorial Institute of Psychiatry, Montreal.

Patients come to the hospital every morning, spend the day getting various kinds of treatment for their sick minds, and then return home to spend the night.

Returning home to the family at night is considered one important part of the treatment, since it keeps the patients in touch with the real life they must return to and be able to cope with if they are to recover fully from their illness.

The absence of locks and bars helps in the treatment, too. From early childhood, we are taught to conform to what our fam-

ilies and society expect of us. A person, especially a sick, confused, frightened person, who is put behind bars and locked up in a bare room may well think he is expected to be violent and destructive, so he will and often does come up to that expectation.

If, as in the day hospital, he is shown that people expect him to be neat and clean and careful of property, he will respond in that way.

Day hospitals for mentally sick patients have a great economic advantage, important in view of the increasing numbers of mentally sick. The savings come from elimination of two out of three shifts of nurses, elimination of two out of three meals, and better utilization of floor space.

A disadvantage is that patients must live no farther than one hour from the hos-

ASTRONOMY

Pluto Not Planet

Dr. Gerard P. Kuiper's demotion of Pluto from planet to runaway moon of Neptune "clinched" by recent discovery that Pluto takes more than six days to complete a rotation.

► PLUTO, considered to be a planet since its discovery in 1930, is actually a run-away moon of Neptune.

The demotion from planet to escaped satellite was "clinched" by the discovery of Pluto's slow rotation of about six and a half days, Dr. Gerard P. Kuiper of Yerkes Observatory told SCIENCE SERVICE. (See SNL, Jan. 28, p. 56.)

The earth is thus one of eight, not nine, planets, Dr. Kuiper said. There are no planets more distant from the sun than Neptune, he believes.

"It is now clear," he stated, "that the presumed perturbations of Uranus and Neptune must be due to minor errors in observations."

Perturbations, or disturbances in the motions, of the planets Neptune and Uranus first led Lowell Observatory astronomers to hunt for a distant planet beyond Neptune.

Discovery of Pluto by young Clyde Tombaugh was announced on March 13, 1930. (See SNL, March 22, 1930, p. 178-181.)

If Pluto were a planet, Dr. Kuiper said, it would have a fast rotation period, resembling that of all other outermost planets.

Photoelectric measurements of changes in Pluto's brightness, caused by light and dark markings on its surface, showed its slow rotation rate of 6.39 days.

The measurements were started by Dr. Kuiper using the 82-inch telescope at McDonald Observatory, Mt. Locke, Texas, run jointly by the Universities of Chicago and Texas.

They were continued by Drs. Merle F. Walker and Robert Hardie with the 42-inch telescope at Lowell Observatory, Flagstaff, Ariz., and results combined.

The slow rotation is "very strong confirmation," Dr. Kuiper explained, that Pluto once belonged to Neptune, and was slowed down when it was still one of Neptune's moons.

The "clinging" evidence supports three other arguments that previously had thrown suspicion on Pluto's right to a true place as a solar system planet, Dr. Kuiper said.

These are the high inclination and eccentricity of its orbit, its mass and diameter, and the known fact that Neptune had lost and then recaptured its two other moons, Triton and Nereid.

A fast rotation rate, a day or less as the other outermost planets have, would have demoted Pluto a planet in spite of these arguments, Dr. Kuiper said.

"Pluto is so far from the sun its rotation could not have been slowed down very much by tidal friction from the sun," he

explained, and the planet Neptune must have caused the decrease in its period. Pluto's mean distance from the sun is 3,670,000,000 miles.

Changing Pluto from a planet to a lost moon of Neptune decreases the number of solar system planets to eight, but increases the number of known satellites from 31, including the earth's moon, to 32.

Because Pluto's orbit cuts inside that of Neptune, it could not have been formed as a protoplanet, or planet-in-being, Dr. Kuiper said.

If it had been produced as a planet at the same time as Neptune, it would have had the same sort of orbit, almost circular, and in the same plane as the orbits of other planets.

Instead, Pluto has a high inclination, or angle, of 17 degrees with that plane and also a high eccentricity.

Another argument for satellite origin, Dr. Kuiper said, is its mass and diameter, about one-thirtieth and 45% that of earth, respectively.

The diameter makes Pluto much too large to have been formed as an asteroid. The mass is about that of Neptune's two other moons, Triton and Nereid.

A third argument favoring Pluto's satellite origin, Dr. Kuiper said, is the known fact that Neptune must have lost all but one percent of its original mass. It was thus able to shed its satellites into space. Triton and Nereid were lost and recaptured. One of the three was lost, and that was Pluto.

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BIOLOGY

Tell Child's Sex Before Baby Born

► WHETHER the coming baby will be a boy or a girl can be told before birth in some cases. It could be told in all cases if doctors could find a safe way to get the fluid needed for the test.

The fluid is that which surrounds the baby in the womb, called amniotic fluid. In some cases a little of this fluid leaks some time before the baby is born, but in most cases it stays in the womb until birth when the bag of water ruptures.

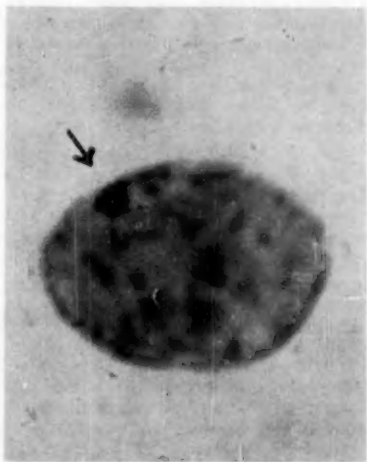
From fluids taken in the ninth month, before the baby was born, Dr. Landrum B. Shettles of Columbia University College of Physicians and Surgeons, New York, correctly predicted the sex of the coming baby in 40 out of 40 cases.

The prediction is based on the fact that

all cells of the body show sex differences. A cell component called chromatin is found in the nucleus of female cells but not in that of male cells. This was discovered by Dr. M. L. Barr and associates at the University of Western Ontario, London, Can. (See SNL, April 17, 1954, p. 246.)

The Canadian scientists pointed out then that, in cases where the true sex of an individual was in doubt, microscopic examination of a bit of skin could tell the person's true sex. They have since reported using this test in more than a score of cases of doubtful sex.

Since sex is determined from the beginning and since all cells of the fetus or infant have the same genetic constitution, then all



FEMALE CELL—Arrow points to the chromatin found in the nuclei of female cells, but not in those of male. When amniotic fluid is tapped, sex of unborn can thus be determined.

the cells of the amniotic fluid have the same genetic constitution, Dr. Shettles reasoned.

From its earliest accumulation, the fluid will have cells reflecting the sex of the unborn infant. Dr. Shettles' tests of the 40 fluids, made without his knowing the sex of the baby until later, confirmed this theory.

The big problem now, he says, is how to get this fluid safely, whether by puncture through the mother's abdomen or through the birth canal.

Being able to predict the sex of the baby in advance does not, of course, mean that anything can be done to change it.

Dr. Shettles' findings will be reported in detail in a forthcoming issue of the *American Journal of Obstetrics* and at the coming meeting of the Federation of American Societies for Experimental Biology.

Meanwhile he has learned through scientific colleagues that three Israeli scientists have made similar successful sex predictions in a smaller number of cases.

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GENERAL SCIENCE

STS Winners' Research

Final 40 competitors for the Westinghouse Science Scholarships will demonstrate their independent scientific projects in Washington. They vie for \$11,000 in scholarships.

► **FORTY** HIGH school seniors, possibly tomorrow's leaders in the world of science, will meet in Washington on March 1, 1956, for five days during which they will take part in the Science Talent Institute. (See SNL, Feb. 4, p. 69.)

They will bring with them exhibits demonstrating their scientific projects which helped win them a place among the top 40 in the country-wide competition.

They will compete for \$11,000 in Westinghouse Science Scholarships. Here are descriptions of a few of the projects that helped win them the trip:

Iron and Nickel Alloys

► **PUZZLED** by an unexpected drop in the electric current of an induction furnace, a senior student in the Eugene High School, Eugene, Ore., embarked on an ambitious research problem.

The student is 17-year-old Daniel Ch'en, son of Prof. and Mrs. S. Y. Ch'en of the University of Oregon. The research program helped Daniel become a finalist in the Fifteenth Science Talent Search.

Seeking expert help in his study of metals in the electric furnace, Daniel learned he had found the phenomenon of the Curie point. At this point iron and nickel change their magnetic quality.

He noted that these points for the two metals differ by more than 400 degrees Centigrade, and made a series of alloys of the two metals. To his surprise, the mixture containing between 70% and 80% iron was found to have a Curie point far out of line with other alloys of the metals.

Daniel is proceeding with his research, and devising an improved type of induction furnace to melt new alloys. He plans to go to the California Institute of Technology, then combine teaching with research in nuclear physics.

Unusual Telescope Lens

► **PATIENT PERSISTENCE** has enabled Dennis Lee Johnson, 17-year-old senior student at Phillips Exeter Academy, Exeter, N. H., to construct an astronomical camera with which he can photograph an unusually large field of stars.

Using the newest development in telescope lens design, Dennis ground both the large mirror and also the special non-spherical lens required for his Schmidt-type camera. Such a design calls for much more work than the usual Newtonian tele-

scope constructed by amateurs.

Dennis is the son of Mr. and Mrs. Wilbur L. Johnson of Canoga Park, Calif.

Fossil Weeds Studied

► **LOWLY WEEDS** today, known as horsetails or scouring rushes, were lofty forest trees when the coal deposits were formed.

Their fossil remains, called calamites by geologists, interest a 17-year-old senior at the Mason High School, Mason, Mich., who shows exhibits of them in his own museum of natural history.

He has found his specimens in local stone quarries, in formations of the Michigan Coal Basin.

Descriptions of the fossils helped Robert Lynn Carroll, son of Mr. and Mrs. John Carroll, win a trip to Washington as a Science Talent Search contestant.

Chinese Puzzle Solved

► **A COMBINATION** of interests ranging from the newest in mechanical brains to ancient Chinese puzzle lore gave a girl in the senior class of Bayley Ellard High School, Madison, N. J., the inspiration for a science project in electricity.

The project helped her win a place among the 40 finalists in the Science Talent Search. She is Rosemary Patricia Och, 17, the daughter of Mr. and Mrs. Henry G. Och. Mr. Och is a military development engineer.

Rosemary devised a new wrinkle in mechanical brains, building one operated by electrical relay circuits that can solve the puzzle of removing five rings from a bobbin when the rings are joined together in a complicated way. Quickest solution of the puzzle takes 21 moves. Her machine solves it in less than 20 seconds, without error. A human competitor requires as many minutes, and is apt to make time-consuming mistakes.

Phosphorescence in Salt

► **STUDIES** of the phosphorescent light given off by ordinary salt and its chemical relatives, known under the general name of alkali halides, formed the research project that helped 18-year-old Dwight Thomas Hoxie of Navarre Rural Station, Wayzata, Minn., to place among winners in the Fifteenth Annual Science Talent Search.

After developing his own methods for timing duration of the phosphorescence, Dwight studied quantum theory to learn how to account for conditions inside the salt crystal producing the light.

Dwight is the son of Mr. D. T. Hoxie. He is a member of the graduating class in the Mound Consolidated High School at Mound, Minn. His mother is Mrs. Leo G. Barnard. Dwight expects to attend the University of Chicago, where he plans to specialize in nuclear and theoretical physics.

Sounds From Nowhere

► **REVERSING** the usual technique of recording sounds as wavy lines on photographic film, a science-minded senior in the Los Angeles High School does the opposite.

He first traces wavy lines on film and then produces sounds never heard before. He finds pure tones come from very carefully constructed curves, while other waves are reproduced as noise. The young science student is Peter Roland Rony, 17, son of Mr. and Mrs. George Rony.

Among practical uses for his wave-recording device, Peter sees the possibility of helping deaf people study sound and thus improve their speech.

On the lighter side, perhaps to help his father, who is a film director, Peter suggests artificially created sound to represent the speech of the "Martians." Noting that "our gallant space explorers" will be sure to encounter such creatures in future movies, Peter says their producers could edit the sound pattern of a normal human voice by his method of recording "to such a degree that the outer space beings could be endowed with speech that is understandable, yet not human."

Cancer Research

► **POSSIBILITY** that immunity to cancer might be induced in mice by proper surgical treatment stimulated a high school girl in Brooklyn, N. Y., to try the experiment after reading about similar research performed by adult scientists.

Fifteen-year-old Susan Elizabeth Zimet is a senior at the Midwood High School. Although she has by no means solved the problem, which puzzles more experienced scientists, she has won the respect of her teachers for the competent way she tackles the research. She has also won a place among the 40 contestants for Westinghouse Science Talent scholarships and will be coming to Washington on March 1 to compete with them for top honors.

Susan, who is the daughter of Mr. and Mrs. Sidney Zimet, hopes to enter Radcliffe College next fall.



HURRICANE-DAMAGE PROTECTION—This wave-testing machine, believed to be the largest in the world, is expected to aid in devising possible methods of protecting coastal areas from hurricane damage. Waves are created by a vertical bulkhead 20 feet high in a concrete tank 635 feet long, 15 feet wide and 20 feet deep, built by the Beach Erosion Board of the Army Corps of Engineers.

In line with her research project, one of her choices for a career is medicine, but another is engineering. In college she wants to study theoretical and applied physics and take all the mathematics courses available.

Oil Traps in Rocks

► A STUDY of how geologic structure can form a trap for migrating underground oil has helped a Shelby High School senior, Shelby, Mont., place among winners of the Fifteenth Annual Science Talent Search.

Leroy Edward Hood, 17-year-old son of Mr. and Mrs. Thomas E. Hood, made the geology study as part of a summer trip with geologists in the Beartooth Mountains last summer.

New Kind of Cheese

► ALTHOUGH she lives in a state noted for cheese making, Ida Louise Riendl, 17, senior in Columbus High School, Marshfield, Wis., had never been inside a cheese factory until interest in bacteriology led her to build kitchen-size working models of cheese-making equipment.

Her bacteria studies are self-directed, and her interests have led her to collect an extensive library on the subject. This project has helped Ida Louise, daughter of Mr. and Mrs. Aloys Riendl, place among the 40 finalists.

Seven kinds of commercial cheese have been made successfully by Ida Louise in her project, cultivating the proper kinds of molds and bacteria to give the recognized qualities of flavor and texture.

She then developed a new variety that she describes as "a soft cheese with the characteristic green, somewhat mottled streaks of commercial mold cheese, but with a pronounced sweetened flavor entirely different from other cheese of its kind."

TV Interference

► IN AREAS where TV "noise" blurs the picture, an automatic device that smooths black flecks or "snow" into a medium gray closer to the scene's background would be welcomed by the viewer.

A high school boy in Tahoe City, Calif., thought so, and has set about designing a gadget to give TV watchers this boon.

The boy is 17-year-old Gary Bertel Anderson, son of Mr. Bertel A. Anderson, a building contractor, and Mrs. Anderson. He will graduate this year from the Tahoe Truckee High School.

Gary's idea for improving television reception was submitted as his research report, part of the requirements for completing his entry in the Science Talent Search. In his device, voltage detector circuits find the values of the video signal immediately preceding and following the

"noise" signal that another noise detecting circuit has spotted and eliminated. It averages them and inserts this average in place of the unwanted disturbance.

"Since the wave segment forming circuits cannot gain enough information to construct an exact duplicate of the original wave which was displaced by the noise," Gary explained, "it constructs a wave which is an average of those immediately preceding and following the noise pulse."

Student's War Game

► A WAR GAME that, unlike chess, takes advantage of the terrain over which the armies must proceed as in modern mechanized warfare, has been devised by a 16-year-old senior at Forest Hills High School, Forest Hills, N. Y.

The mathematics of games led to the development of this pastime by Martin Gary Groder, son of Mr. and Mrs. William Groder of Flushing, N. Y.

Development of the game, which offers players a choice of 12 kinds of countryside, built up of colored plastic, to fight over, started with a board on which globules of mercury were used as playing pieces. They were later replaced by more conventional counters. Gains and losses are scored by principles of modern logistics.

Ear Bones of Fish

► FOSSIL EAR BONES of fish found in rocks in America and England, and recent ones saved by cooperative British fishermen, gave a teen-age University High School scientist in Minneapolis, Minn., his subject for research.

When he learned that paired bones in the head of fish not only tell the kind of fish but give a record of the fish's age, John Howland Campbell, son of Dr. and Mrs. Berry Campbell, began his collection. Dr. Campbell is professor of anatomy at the University of Minnesota.

Photographs 17-year-old John took with polarized light show the growth rings, somewhat like the rings in the trunk of a tree, which are added yearly to the tiny ear bones. These he dissected from unusual fish heads market men saved for him two years ago, when he was spending a year in London.

He collected 250 pairs of otoliths, as the fish ear bones are called, and identified 17 different species. Fossil otoliths he found in England and in America form another part of his collection.

Wishing to take photographs to show the delicate structure of the tiny bones, John devised a way to make light shine through but not around the specimens, by making a polarized light background out of a pair of 3-D movie glasses.

The young scientist also worked out a formula correlating sizes of the otoliths with length of the fish heads from snout to gill. Since he had only the heads, he needed such a check on the size.

AGRICULTURE

Rain Leaches Food From Plant Leaves**See Front Cover**

► RAIN washes away food from the plants themselves, besides leaching plant food from the soil, a team of Michigan State University scientists have discovered.

Using radioactive materials in the plants as tracers, they found that up to 71% of the potash in leaves was removed in four hours of simulated rain. Chemical analysis of the leaves also showed that nitrogen, calcium, magnesium, boron, manganese, iron and copper may be lost in rain.

These findings indicate that continued rain on plants may reduce their growth rate severely, requiring use of supplemental fertilizer for satisfactory crop yields. Drs. W. G. Long, D. V. Sweet and H. B. Tukey told the Conference on Radioactive Isotopes in Agriculture in East Lansing, Mich.

Also described at the meeting were the changes in petal coloring and plant structure that occur in snapdragons grown in radioactive environment.

Norman D. Williams of the University of Nebraska grew the purple snapdragon flower which is shown on the cover of this week's SCIENCE NEWS LETTER at Argonne National Laboratory, Lemont, Ill.

It shows a mutant area or white streak presumably due to a hereditary change caused by radioactivity emitted by carbon 14 supplied to the growing plant.

Science News Letter, February 11, 1956

GENERAL SCIENCE

Honorable Mentions Listed in Talent Search

► HONORABLE MENTIONS in the Fifteenth Annual Science Talent Search have been announced by Watson Davis, director of SCIENCE SERVICE.

The young scientists honored go to school in 150 communities, located in 38 states and the District of Columbia. They were chosen from among 20,828 entrants, 3,375 of whom completed the science aptitude examination, submitted recommendations and scholarship records and wrote reports on scientific experiments they had devised and then conducted.

Of the 260 outstanding seniors in the list, 49 are girls and 211 are boys, the ratio being determined by the number of girls and boys who completed entries in the competition.

Forty highest-ranking boys and girls already have been notified that they are winners of all-expense trips to Washington. (See SNL, Feb. 4, p. 69.)

All selected for honors will be recommended for scholarship awards by the nation's colleges and universities.

Students in the honorable mentions list invariably rank high in their high school graduating classes: 35% of the boys and

49% of the girls stood first, second or third in their high school classes.

The honorable mentions did not win their places merely by keeping their noses in books. Without exception they show records of participation in extracurricular activities. Science clubs have attracted 216 of these students. Most of these clubs are affiliated with Science Clubs of America.

Nearly half of the honorable mentions have had experience in local, regional, or state science fairs. Four of them have been finalists at the National Science Fair, also conducted by Science Clubs of America.

State Science Talent Searches in 29 states and the District of Columbia are being conducted concurrently with the national competition, using entries in the National Science Talent Search turned over to the state judging committees.

From their entries they will honor state winners with scholarships to various state colleges and universities, or otherwise assist them with their further study of science.

Science News Letter, February 11, 1956

SURGERY

Surgeon Urges Return Of Walking Canes

► A RETURN to the use of walking canes was advocated by the president of the American Academy of Orthopaedic Surgeons at the organization's meeting in Chicago.

Describing the cane as a valuable medical aid, Dr. Walter P. Blount of Milwaukee pointed out that it is particularly helpful as a means of preventing fatigue and for persons who have had bone and joint injuries.

He claimed the cane has fallen into general disrepute because people tend to think of it as a sign of deterioration.

"A fat lady may waddle like a duck when she laboriously walks a few steps, but she resents the suggestion that she carry a cane. She would look much better with a stick than with a limp, and with support she could walk enough to get some exercise. More walking would help with weight reduction," he explained.

In his presidential address, Dr. Blount pointed out that the main purpose of the cane was to relieve stress.

He called for a propaganda war of education to bring the walking cane back into the public favor. Patients with residuals of poliomyelitis need canes, and early degenerative hip disease may require no treatment other than a cane, he said.

In popularizing the cane, Dr. Blount advised, it has to be both efficient and good-looking.

It should hang from the forearm to free the hand, but should remain within easy reach. Canes might be sold like cars on the basis of novelty features. Hidden swords are no longer permissible, but many ancient cane accessories could be revived. Flashlights, bottles, umbrellas and built-in seats would be useful.

Science News Letter, February 11, 1956

IN SCIENCE

FORESTRY

Fewer Fires Burn Out More Acreage

► FEWER FOREST FIRES burned out more acreage on Federal lands in 1955 than in 1954, the U. S. Forest Service has reported.

A total of 8,160 fires ate through Government forest land in 1955, compared to 10,462 reported in 1954. These 20% fewer fires, however, consumed almost two and one-half times as much timberland.

In 1955, 365,905 acres burned as compared to 142,253 acres the previous year. California, which had the largest area swept by fire, lost almost half the U. S. total and more than the 10,462 fires altogether burned out in 1954, or 183,525 acres.

Science News Letter, February 11, 1956

SURGERY

Radiation-Sterilized Bones Transplanted

► SUCCESSFUL AND SAFE transplantation to human patients of bones sterilized by high intensity gamma radiation from radioactive cobalt was announced by Drs. Paul DeVries, Carl E. Badgley and J. Ted Hartman of the University of Michigan, Ann Arbor, at the American Academy of Orthopaedic Surgeons meeting in Chicago.

Bone sterilized in this way was used in 80 transplant procedures on 67 patients, of which 62 were spinal fusions. Of these, 76 healed without wound infection and without unusual body reaction. Drainage that eventually healed without chronic inflammation of the bone marrow developed in four patients after the operation.

Although the treatment with radioactive cobalt killed any bacteria and viruses that might have been in the bones, there was no residual radioactivity. The character of the bone and its capacity for further growth were not changed.

The bones, which can be taken from dead bodies, are cut into various shapes and sizes by a heavy duty band saw. They are then freeze-dried and sealed in glass tubes under vacuum.

The radiation comes from cobalt rods held in a cylindrical frame and shielded in a water well within a concrete cave.

To sterilize the bone, it is simply necessary to place the tubes containing the bone within the concrete cave and, by means of a remote control winch, raise the source from its well into the radiation chamber.

At the end of a 20-hour period, the cobalt is returned to the well, and the bone removed and stored at room temperature.

Science News Letter, February 11, 1956

CE FIELDS

MEDICINE

Predicts Less Heart Disease in Ten Years

► A PROPHECY that heart disease in young and middle aged people throughout the world will have been markedly reduced ten years from now was given by Dr. Paul Dudley White of Boston, consultant to President Eisenhower's physicians, at the opening of the American Heart Association's 1956 Heart Fund campaign in Chicago.

The prophecy was qualified by the statement "if we go about the task vigorously and adequately."

A plea for funds to extend the study of diseases of the heart and circulation to countries all over the world was also made by Dr. White.

Such studies, he said, "not only can be valuable for the people of the world outside this country, but may actually be more valuable for our own citizens than much of the work that goes on in the laboratories and hospitals in the U.S.A. today."

"President Eisenhower's recent illness," Dr. White said, "has focused the attention of the American people, as never before, on the seriousness of the problem of heart disease."

"It is a national problem, your problem and mine. And the solution can only come through expanded research, education, and the application of the knowledge we already have through programs in the community."

The message from the President which Dr. White read stressed the fact that the President is especially gratified that "hope, rather than fear, is the keynote of the program" of the American Heart Association's campaign.

Science News Letter, February 11, 1956

BIOCHEMISTRY

Food Eaten May Cause Mental Illness

► THE FOOD a person eats may subtly affect his mind up to the point of deranging it.

Studies suggesting this and also suggesting better methods of treating, or even perhaps preventing, mental sickness are under way at the Galesburg State Research Hospital, Galesburg, Ill. (See pp. 84 and 85 for related stories.)

The studies are being made by Dr. William T. Sullivan, and the benefits to come from them are still in the future.

So far, working with animals, Dr. Sullivan has found that very small amounts of anti-vitamins and of anti-amino acids, which all of us normally eat in our food,

may block the vitamins and the protein-building amino acids.

In the case of one vitamin, niacin, the anti-pellagra vitamin, mental illness can result if people do not get enough of the vitamin, as has been known for years.

More recently it has been found that a chemical called 3-acetyl pyridine is the anti-vitamin that blocks niacin. An anti-chemical for the important brain chemical serotonin has also been found.

By feeding very small amounts of these chemicals to laboratory rats, changes in behavior such as might come in mental illness in human patients have developed. The animals were eating a good diet and did not lose weight or show any signs of sickness. The only sign that something was wrong was in their behavior.

Instead of coming to the front of the cage when a pencil is poked in, as a rat's curiosity would ordinarily lead him to do, the animals getting the anti-serotonin chemical retreated to the back of the cage and sat there like patients with the mental disease, catatonia. They were obviously constantly frightened.

Perhaps, the scientists now are speculating, some such body chemical situation is responsible for some cases of mental illness. Some people may be more susceptible to small amounts of anti-vitamin and other anti-metabolites than other persons. This would result in their getting mentally sick on apparently good diets.

Science News Letter, February 11, 1956

FORESTRY

Billions of Board Feet Are Lost to Disease

► TREE DISEASES in the West cause an estimated annual loss of 890,000,000 board feet and a loss to growth of about 3,400,000,000 board feet, a total loss impact of 4,300,000,000 feet, F. H. Raymond, state forester from Sacramento, Calif., reported at the 46th Western Forestry Conference in Portland, Ore.

"As villains, diseases are responsible for more than 10% of the loss in western stands and about 65% of all growth losses. The annual growth loss is equivalent to 22% of the 19,700,000,000 board feet of lumber produced in 1952. This represents a value of \$64,500,000," Mr. Raymond said.

Heart rot accounts for almost half the growth impact losses. Root diseases, found on Douglas-fir and pine, are the greatest killers. Stem parasite, like dwarf mistletoe and white pine blister rust, also rank high in causing losses. Pole blight on western white pine and needle cast on ponderosa pine are also causing concern.

To cope with the silent killers, Mr. Raymond suggested expanded and improved disease surveys, developing forest practices to aid control, studying rate of deterioration of killed timber, developing further fundamental information on important diseases, developing resistant tree races and studying economic limitations of control.

Science News Letter, February 11, 1956

GENERAL SCIENCE

Foreign Travel Support To Scientists Urged

► CONGRESS should give aid to scientists for travel to scientific conferences abroad as it justifiably gives aid for foreign trips by Congressmen and the cast of Porgy and Bess, the American Association for the Advancement of Science's journal, *Science* (Jan. 27), suggests editorially.

Since July, the National Science Foundation has had no money to help send American scientists to international scientific meetings, although it had funds during the three previous years.

A resolution by the AAAS council at its recent Atlanta meeting asked Congress to approve budget requests for travel funds for the coming year.

Among important meetings affected would be the International Genetics Congress in Japan next September.

Science News Letter, February 11, 1956

METALLURGY

Study Reasons Why Airplane Metals Fail

► IF ENGINEERS can keep the metal in airplanes from getting "tired" or design them to provide adequate safety, one out of five airplane accidents such as have occurred in the last six years will be avoided.

This is the plan of an International Conference on Fatigue in Flight Structures held at Columbia University.

Engineers can now detect microscopic changes produced in metals, such as aluminum, by fatigue stresses, Dr. P. J. E. Forsyth of the Royal Aircraft Establishment, Farnborough, England, said.

Before the use of the electron microscope and electrolytic polishing, Dr. Forsyth reported, definite signs of metallurgical damage to the structure were unseen.

Now it has been shown there is a difference in the appearance of slip bands produced in annealed aluminum by fatigue and those produced by static stress. These slip bands, which are the first step to failure of the metal, are produced under static stress only at high temperatures.

In cold-rolled aluminum, the effects of failure are even greater, and are often associated with regions where the aluminum has recrystallized.

It is believed that fatigue stress depends on atomic rearrangements leading to soft zones in the material.

Prof. W. A. Wood of the University of Melbourne, Australia, reported that fatigue follows from a special deformation initiated by a "fine slip" in the metal. Static stress on the material brings on what is known as a "coarse slip." The "fine slip" is uninhibited because it does not build up local strain-hardening.

Eventually, slight to-and-fro motions produce fatigue cracks that result in failure.

Science News Letter, February 11, 1956

MEDICINE

Top Level Medical Care

Protecting the health of a U. S. president calls for top level medical care. The burden of the office and its effect on presidential health was noted early.

By JANE STAFFORD

► PRESIDENT EISENHOWER'S heart attack in September, 1955, brought a team of top-flight doctors to his bedside: Maj. Gen. Howard McC. Snyder, his personal physician; Col. Thomas W. Mattingly, heart specialist, of Walter Reed Army Medical Center, Washington, D. C.; Col. Byron E. Pollock, chief of cardiology service, Fitzsimons General Hospital, Denver, and Dr. Paul Dudley White of Boston, a civilian and probably America's best-known heart specialist.

What of other Presidents and their doctors? Our first President, George Washington, had six doctors attending him at various times, according to medical records searched by Charles Roos, chief of the document section at the Armed Forces Medical Library in Washington, D. C.

One of them, Dr. James Craik, was not only his personal physician but his life-long friend. The custom of having presidential physicians members of the Armed Forces did not start until much later, but Dr. Craik played a distinguished role in the medical affairs of the Revolutionary Army. And when there was rumor of war with the French he was made Physician General of the Army at Washington's request. He was "attending physician" at Washington's death in 1797.

Pneumonia Hit Washington

The health of our first President must have given his physicians plenty of concern. One of them, Dr. Samuel Bard, is credited with having saved his life early in his first term. He operated on Washington after the inauguration, for a carbuncle of the thigh. Pneumonia set in as a complication.

There were, of course, no sulfa drugs nor penicillin nor other antibiotics in those days. It took our first President 109 days to recover from that first pneumonia attack. The operation and the pneumonia kept Washington under Dr. Bard's immediate care for more than three and a half months.

Saving Washington's life is not Dr. Bard's only claim to fame. He was instrumental in founding the first hospital in New York and took a leading role in establishing New York's first medical college.

Washington had another attack of pneumonia a year later and was never in the best of health afterwards. At the time of this attack, Dr. John Jones made an emer-

gency trip from Philadelphia to New York to care for the President. Dr. Charles McKnight served as consulting physician at that time.

The Washington family continued to have Dr. Jones as physician until his death in 1791. When Washington Custis had measles, however, he was treated by Dr. Adam Kuhn.

At the time of Washington's last illness, Drs. Elisha Cullen Dick and Gustavus Brown were called in consultation with Dr. Craik.

Going down the list of Presidents, Mr. Roos found record of only one physician for John Adams. This was the Dr. Holbrook who was physician to John Adams at his death.

Thomas Jefferson is reported to have known a good deal about medicine himself and to have prescribed for his own household. He did not always agree with medical men.

Benjamin Rush, signer of the Declaration of Independence and one of America's famous early physicians, was a personal friend of Jefferson's and occasionally was

consulted by Jefferson by letter.

One time Jefferson wrote Rush about a chronic diarrhea. Rush replied giving advice about treatment, including a diet. Another time Jefferson wrote Rush that he found it helpful to bathe his legs and feet in cold water every night. Dr. Rush advised against this.

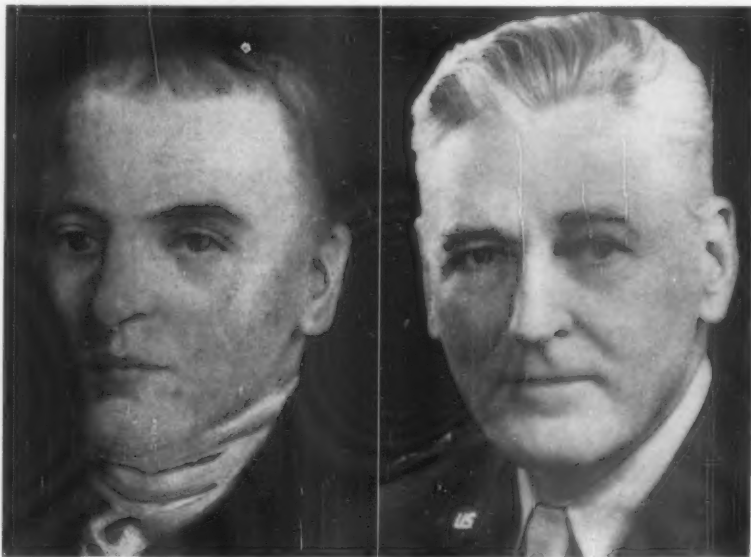
Jefferson, a student of classic literature including the Latin, presumably got the idea from advice on cold baths given by a Roman doctor, Suetonius, who was physician to the Emperor Augustus.

Listed also as a physician to Jefferson is Robley Dunglison. This doctor came from England to the United States at Jefferson's request to serve as professor of medicine at the University of Virginia, which Jefferson founded. He was the attending physician at Jefferson's death.

Burden Noted Long Ago

Dr. Dunglison also served our next President, James Madison. He treated Madison for rheumatism and arthritis. For the last 20 years of Madison's life, however, his regular family physician was his cousin, Dr. Charles Taylor.

The burden of the White House and its effect on a President's health was noted as long ago as the time of our sixth President, John Quincy Adams, who wrote of it and



PRESIDENTIAL PHYSICIANS—George Washington's physician and life-long friend, Dr. James Craik, on the left, and Dwight D. Eisenhower's physician, Major General Howard McCrum Snyder, on the right. These are the official pictures contained in an exhibit in the Smithsonian Institution in Washington, D. C.

apparently discussed it with one of his physicians, Dr. Henry Hunt. This charter member of the Medical Society of the District of Columbia repeatedly advised and urged his distinguished patient, as Adams wrote himself, "to spend the summer in the North and vegetate myself in a healthier climate."

If the burden of the office of President has been hard on its incumbents, the burden of caring for the Presidential health may well have been hard on the various medical men who served as physicians to our Presidents.

A statement after the death of President Harrison, first U. S. President to die in office, comments on this as follows:

"The deep political and personal interest dependent on the life of the President imposed on his attending physician a fearful responsibility, of which he felt himself painfully mindful. He speedily sought consultation and was scarcely ever absent from the house more than one hour together."

This statement was signed by five physicians, and the attending physician referred to was Dr. Thomas Miller. One of the five consultants called when President Harrison was stricken with the fatal attack of pneumonia was Dr. James C. Hall.

Dr. Hall must have been a strong-hearted man because he shouldered the responsibility of serving as family physician to some six or eight Presidents and their families.

One authority says he "attended professionally every President from Adams to Lincoln and a greater number of eminent American statesmen and foreign dignitaries residing here during that period than any other physician."

Dr. Hall left no memoirs. He was an early member of the Medical Society of the District of Columbia. Mr. Roos says of him: "A man of independent means, he fell afoul of the Society's controversial regulations by failing to charge fees for his service. Dr. Hall was severely censured by the Society and repented in tears—it is recorded."

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GENERAL SCIENCE

Warn About Science Evils

► AN IMPLIED WARNING that America should beware of allowing the Government, in its support of science, to fall unwittingly into evils practiced by Communist governments toward science was sounded by Dr. Raymond T. Birge of the University of California in delivering the retiring presidential address to the American Physical Society meeting in New York.

He warned especially against allowing ourselves to be overtaken by too much planning in basic research. He cited Communist dogma suggesting that all scientific research can and must be planned, and which asserts that teams of researchers of ordinary ability can accomplish more than geniuses.

The physicist quoted passages from a policy speech by Jan Dembowski, president of the Polish Academy of Sciences, which was intended for internal consumption.

Some sample Dembowski quotes, embodying ideas that are the antithesis of Western concepts of science, are:

"We must break away from the idea that scientific work is the result of inspiration, which cannot be planned . . ."

" . . . it will be necessary . . . to fix norms for the amount of work to be done . . ."

"We cannot depend on geniuses, and with increasing frequency we are trying to solve scientific questions by working on them in teams. Today, a group of people of average ability, such as we can always mobilize, and who have a problem clearly marked out . . . can accomplish more than a single genius working on his own . . ."

Dr. Birge said that although Soviet scientists seem to be the highest paid group in Russia next to the politicians, "their personal freedom, or rather lack of freedom, seems to me to show certain striking similarities to the situation of the slaves of ancient Egypt or Greece."

The scientist also warned that America is likely to suffer, culturally, economically and defense-wise, unless measures are taken to cure the current shortage of scientists.

He predicted the current shortage of physicists is likely to last for another decade. Although every man, woman and child benefits from products that have their origin in the physics laboratory, an appalling percentage of Americans are never even exposed to the physical sciences during their schooling.

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17. BRUCH: Violin Concerto
18. PAGANINI: La Campanella
19. MOZART: Clarinet Quint. in A
20. SAINT-SAENS: Violin Concerto No. 3
21. MOZART: Symph. Nos. 40 & 34
22. GOLDMARK: Rustle Symph.
23. BEETHOVEN: Symph. No. 7
24. CHOPIN: Sonata No. 24
25. FRANCK: Symph. in D
26. STRAVINSKY: Firebird, and Piano Con.
27. SCHUBERT: Symph. No. 3
28. PROKOFIEFF: Violin Con. No. 1 and Piano Con. No. 1
29. MENDELSSOHN: "Scott" Symph.
30. DVORAK: "American" Quar.

Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ADVANCED ANALYTICAL CHEMISTRY—Walter Wagner, Clarence J. Hull and Gerald E. Markle—*Reinhold*, 282 p., illus., \$6.00. For the beginning graduate student.

THE ANTARCTIC CHALLENGED—Admiral Lord Mountbatten—*John de Graff*, 247 p., illus., \$4.50. Reviewing all that has been learned of the Antarctic before this year.

BIOLOGY AND TAXONOMY OF NORTH AMERICAN BEETLES OF THE SUBFAMILY GEOTRUPINAE WITH REVISIONS OF THE GENERA BOLBOCEROSOMA, EUCANTHUS, GEOTRUPES AND PELTOTRUPES (SCARABAEIDAE)—Henry F. Howden—*Smithsonian*, 169 p., illus., paper, free upon request direct to publisher, Washington 25, D. C.

BULLETIN OF THE AMERICAN PHYSICAL SOCIETY. Series II, Vol. I, No. 1—Karl K. Darrow, Ed.—*American Physical Society*, eight issues a year, 77 p., paper, \$5.00 per year, single copies \$1.00. Abstracts formerly reprinted in the *Physical Review* will, with the start of the new series, appear only in this bulletin.

A CHECK-LIST OF THE FOSSIL AND PREHISTORIC BIRDS OF NORTH AMERICA AND THE WEST INDIES—Alexander Wetmore—*Smithsonian*, Miscellaneous Collections Volume 131, Number 5, 105 p., paper, 70 cents. Describing several species known only from bones found during archaeological excavations or in pre-Columbian Indian kitchen middens.

CONTRIBUTIONS TO THE NOMENCLATURE, SYSTEMATICS, AND MORPHOLOGY OF THE OCTOCORALLIA—Frederick M. Bayer—*Smithsonian*, 13 p., illus., paper, free upon request direct to publisher, Washington 25, D. C.

DENTAL ABSTRACTS: A Selection of World Dental Literature, Volume 1, Number 1—Lon W. Morrey—*American Dental Association*, monthly, 64 p., illus., paper, subscriptions \$6.00

per year. Summaries of articles from the major dental journals of the world. The reader may borrow the complete article if he wishes.

A DESIGN FOR NON-STICKING PLUG AND RING GAGES AND LOCATORS—Lawrence E. Doyle, Bernard R. Better and Bei Tse Chao—*University of Illinois, Engineering Experiment Station Bulletin No. 433*, 28 p., illus., paper, 45 cents. How to keep a plug from sticking or going in crooked in a close-fitting hole.

ELEMENTS OF QUANTITATIVE ANALYSIS: Theory and Practice—Hobart H. Willard, N. Howell Furman and Clark E. Bricker—*Van Nostrand*, 4th ed., 576 p., illus., \$5.85. Revised to include as many new developments as possible.

FLUID FLOW IN PRACTICE: A Collection of Papers Originally Presented in Philadelphia, Pa., in May, 1955, Under the Auspices of the Philadelphia-Wilmington Section of the American Institute of Chemical Engineers and the Department of Chemical Engineering, University of Pennsylvania—J. R. Caddell, Ed.—*Reinhold*, 119 p., illus., \$3.00. Directed to young engineers.

FLUIDIZATION—Donald F. Othmer, Ed.—*Reinhold*, 231 p., illus., \$7.00. The fluidization technique using gases is one of the major engineering developments of the last 25 years.

FUNDAMENTALS OF QUANTITATIVE CHEMICAL ANALYSIS: Semimicro Method—Roy K. McAlpine and Byron A. Soule—*Van Nostrand*, 4th ed., 340 p., illus., \$5.00. Intended to give the student direct contact with the chemical behavior of a number of common metals and acid radicals.

IMMUNOLOGY AND SEROLOGY—Philip L. Carpenter—*Saunders*, 351 p., illus., \$6.50. A textbook for advanced students.

INFORMATION THEORY IN PSYCHOLOGY: Problems and Methods—Henry Quastler, Ed.—*Free Press*, 436 p., illus., \$6.00. Proceedings of a conference on the estimation of information flow.

THE KEY TO INTERPLANETARY SPACE TRAVEL—Bradford Chambers and Eve Chambers—*Stravon*, 66 p., illus., \$1.50. Discussing some of the problems involved in plans for interplanetary flight—time required, fuel required, difficulties involved.

MARKETING COSTS FOR FOOD—Agricultural Marketing Service, USDA—*Govt. Printing Office*, USDA Miscellaneous Publication No. 708, 14 p., illus., paper, 10 cents. The farmer's share of each dollar you spend on food has declined from 53 cents in 1945 to 41 cents in 1955, but retail food prices are now more than double what they were in 1940.

THE MATHEMATICS OF PHYSICS AND CHEMISTRY—Henry Margenau and George Moseley Murphy—*Van Nostrand*, 2d ed., 604 p., illus., \$7.95. Forming a bridge between ordinary training in differential and integral calculus and the mathematical knowledge needed for advanced scientific developments.

MODIFICATIONS OF PATTERN IN THE AORTIC ARCH SYSTEM OF BIRDS AND THEIR PHYLOGENETIC SIGNIFICANCE—Fred H. Glenny—*Smithsonian*, 97 p., illus., paper, free upon request direct to publisher, Washington 25, D. C. Discussing implications with respect to the evolution of this system of arteries in birds.

THE NATIONAL RESEARCH COUNCIL (CANADA) REVIEW 1955—E. W. R. Steacie, President—*National Research Council (Canada)*, 268 p., illus., paper, 75 cents. Describing work done during 1954, but including some later studies.

National Research Council (Canada), 268 p., illus., paper, 75 cents. Describing work done during 1954, but including some later studies.

NATIONAL SCIENCE FOUNDATION FIFTH ANNUAL REPORT 1955—Alan T. Waterman, Director—*Govt. Printing Office*, 159 p., illus., paper, 50 cents. Emphasis, the foreword indicates, must surely be placed upon the development of both the competence and the interest of individuals. This problem is only partly related to national security.

THE NATURE OF HYPNOSIS—Paul Schilder, translated by Gerda Corvin—*International Universities Press*, 204 p., \$4.00. Written about 25 years ago, this book is offered by the publisher for its historical as well as intrinsic value.

NUCLEAR PHYSICS: Monthly Journal Devoted to the Experimental and Theoretical Study of Atomic Nuclei, Nuclear Fields and the Fundamental Aspects of Cosmic Radiation, Volume 1, No. 1—L. Rosenfeld, Ed.—*North-Holland Publishing Co. (Interscience)*, 72 p., paper, \$15.00 per year. Abstracts and some text are in English.

PHILANTHROPIC FOUNDATIONS—F. Emerson Andrews—*Russell Sage Foundation*, 459 p., \$5.00. Information about some 5,000 foundations existing today in the United States.

PRACTICAL TEXTILE CHEMISTRY—J. W. Bell—*Chemical Publishing Co.*, 1st American ed., 259 p., illus., \$4.75. Providing training for the textile student. Contains experiments illustrating the fundamental properties of fibers.

RECENT STUDIES IN AVIAN BIOLOGY—Albert Wolfson, Ed.—*University of Illinois Press*, 479 p., illus., \$7.50. Intended to demonstrate our ignorance of important facts and so stimulate further research in ornithology.

SCIENTIFIC RESEARCH EXPENDITURES BY THE LARGER PRIVATE FOUNDATIONS—prepared for the National Science Foundation by F. Emerson Andrews—*Govt. Printing Office*, 21 p., illus., paper, 25 cents. Some \$26,000,000 was expended, the major part for life sciences, biological, agricultural and medical. Only 43 of the 77 major foundations supported scientific research.

A SCIENTIST'S SCIENTIFIC METHOD—L. C. Glass—*Glass*, 3d ed., 48 p., paper, \$1.00. Discussing how to tell what is truth, and the origin of some ancient unscientific beliefs and folk-tales.

A SHORTER VERSION OF THE SECOND EDITION OF THE VERTEBRATE BODY—Alfred Sherwood Romer—*Saunders*, 486 p., illus., \$5.50. This abbreviation of the work is intended to make it more suitable as a text for brief courses.

SOCIAL SCIENCE RESEARCH COUNCIL ANNUAL REPORT 1954-1955—Pendleton Herring, president

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dent—*Social Science Research Council*, 86 p., paper, free upon request direct to publisher, 230 Park Ave., New York 17, N. Y.

SYNONYMICAL NOTES ON NEOTROPICAL FLIES OF THE FAMILY TABANIDAE (DIPTERA)—G. B. Fairchild—*Smithsonian*, Miscellaneous Collections Volume 131, No. 3, 38 p., paper, 60 cents. The nomenclature of these flies has long been in a state of great confusion.

THE TENTH WONDER: Atomic Energy—Carleton Pearl—*Little, Brown*, 129 p., illus., \$3.00. The title may make you wonder about the eight and ninth wonders. The author explains, "Everybody has his own favorite eighth wonder, Albert Einstein's theory of relativity is the ninth." A simply written, readable book from Columbia's School of Engineering.

Science News Letter, February 11, 1956

FORESTRY

Battle Against Tree Disease Being Won

► THE WAR against the costly blister rust disease that attacks white pines is being won.

The deadly plant disease has been checked on 17,000,000 of the 23,300,000 acres where control is needed throughout the nation, the U. S. Forest Service has reported.

Under attack in 32 states, the disease was responsible in a recent typical year for the destruction of 623,000,000 board feet of sawtimber.

In the fight against the blister rust, 12,800,000 wild currant and gooseberry bushes, which act as intermediary hosts for the disease, were destroyed.

Science News Letter, February 11, 1956

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SURGERY

Find Ankle Spurs in 45% Of Young Athletes

► UNSUSPECTED ANKLE SPURS were found in 45% of a group of 120 young athletes aged 15 to 25, Dr. Don H. O'Donoghue of Oklahoma City reported to the American Academy of Orthopaedic Surgeons meeting in Chicago.

In another 120 non-athletes of the same age, the X-ray examination showed spurs in only 16 of the men. This, Dr. O'Donoghue said, shows that excessive activity plays a part in the spur formation.

Spurs are bony overgrowths on ankle or shin bone. They are hard to detect. Often they are found responsible for mysterious loss of "drive" in an athlete who previously had been a star performer. Because there is no swelling, pain or tenderness to show the spur, team mates and coaches may think the player is shirking.

Restricting activity is usually enough to relieve symptoms, Dr. O'Donoghue reported. Surgery offers a good chance for cure. Spurs did not recur in 14 patients he operated on.

A high percentage of patients who see a doctor give a history of relatively mild injury to the ankle some time in the past.

Science News Letter, February 11, 1956

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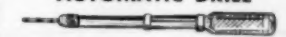
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RADIO ASTRONOMY

Discover Radio Waves Absorbed by Nebula

► **DISCOVERY** that radio waves are absorbed by one mass of glowing gas in the heavens known as an emission nebula was reported by three Australian radio astronomers.

The Australian discovery means that radio astronomers can isolate individual objects by their absorption of certain energy bands in the radio region, just as optical astronomers now analyze a stellar composition by absorbed light.

Although only one emission nebula, NGC 6375, has so far been thus isolated, larger radio telescopes now being built or planned should result in similar discoveries for other objects.

Drs. B. Y. Mills, A. G. Little and K. V. Sheridan of the Commonwealth Scientific and Industrial Research Organization, Sydney, Australia, report the first case of absorption of radio waves by an emission nebula in *Nature*, (Jan. 28).

They used the 1,500-foot radio antenna at Sydney to study 14 nebulas at a wavelength of three and a half meters, or about 11 and a half feet.

Shortest radio waves from commercial AM stations are measured in hundreds of feet.

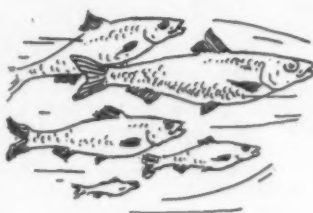
Six were observed in emission, seven were not detected at this wavelength, and NGC 6375 was found to be an absorber.

Astrophysicists thus have a method of learning about the physical characteristics of emission nebula without depending on optical measurements, made unreliable by obscuring dust between the earth and such objects.

The Australian scientists estimate the nebula's temperature as 6,500 degrees Kelvin, somewhat lower than usually assumed from optical measurements.

Position of the nebula, they found, was in good agreement with previous optical sightings and with its location based on radio waves about an inch long, which only last year scientists at the Naval Research Laboratory, Washington, D. C., discovered were being broadcast by the object. (See SNL, April 16, 1955, p. 243.)

Science News Letter, February 11, 1956



Fish Schools

► **FISH IN SCHOOLS** have much in common with children in schools. So long as there is order among them, each facing the front attentively and in his given place, then "schooling" can be accomplished. But when the bell rings for recess and they each dash off in an independent direction, even though they stay in the "school room," then you have only an "aggregation," not a school.

A true school of fish is a group in which all of the individuals are facing in a common direction, parallel to one another and regularly spaced. They should be moving at a uniform rate of speed. In an aggregation of fish, on the other hand, the group is attracted together but is not uniformly spaced or directed.

There may be "false schooling" on occasion, when an aggregation of fish line up in the same direction in response to a water current. One scientist, experimenting with the sunfish, *Lepomis*, found that his test fish all faced the flow when a current was started in their tank, but they broke up as soon as the current was stopped—something like the recess bell!

This scientist, Dr. James W. Atz of the New York Zoological Society, believes fish that cannot see one another will not school, nor even form aggregations. Vision plays

the dominant role in fish schooling, he suggests, with other senses like touch and smell having lesser parts.

How do fish form schools? There are many guesses, and here are two of the best.

First, two or more fish swim towards each other, coming into visual range. When this happens, they line up in parallel paths to keep each other in the desired close range. A certain antagonism, however, operates to keep them a minimum distance apart.

Another idea is that schooling fish use each other as visual reference points, to help locate themselves in the empty space of water. Typical schooling fish are usually those of the open sea, where there is practically nothing—save another fish—for a constantly moving fish to fix upon to give himself a sense of location.

Do schooling fish have individual leaders? Only with the tunas has it been established with reasonable certainty that there are "teachers" in fish schools.

Science News Letter, February 11, 1956

BIOCHEMISTRY

Drug Permanently Excites Mice

► **A CHEMICAL** so exciting that one or two injections make mice run continuously for the rest of their lives, except when they sleep and eat, is under study at the Allan Memorial Institute, Montreal.

The chemical is a nitrile compound, iminodipropionitrile. The continuously running mice are being studied by Dr. H. Azima of the division of psycho-pharmacology.

Because the mice stop running long enough to eat they do not lose weight. The running may go on, however, for two and a half years, or until the end of the mouse's life.

Whether this drug could safely be given to patients who need to be aroused from trance-like states of mental illness cannot yet be told. Further tests on larger animals such as monkeys are needed to determine whether it would be safe.

Meanwhile Dr. Azima has given the mice some of the new tranquilizing drugs. These slow them down and they do not run quite so much or so vigorously.

Science News Letter, February 11, 1956

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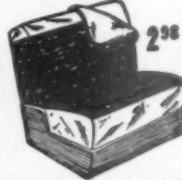
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PHYSICS

Future H-Bomb Power

► **PEACEFUL USE** of the H-bomb reaction is many years in the future, the Atomic Energy Commission assured Congress in its Nineteenth Semiannual Report.

After confirming existence of research on controlled thermonuclear research at five institutions, the AEC said many years of intensive theoretical and experimental research will be needed before the first form of a machine using light elements as atomic fuel can be produced.

Human cancer is being attacked with protons, hearts of hydrogen atoms, in experiments reported from the University of California at Berkeley. Cyclotron-produced protons were used on 30 patients, including 28 in advanced stages of cancer of the sort that may be benefited by pituitary inactivity.

The proton treatment caused good suppression of pituitary function and a number of the patients obtained considerable relief.

Doses of ionizing radiation that produce moderate incapacity can reactivate latent epidemic typhus infections, research on monkeys at the Johns Hopkins University School of Public Health, Baltimore, has shown. The AEC suggested the possibility this might be a health hazard complicating the period following very heavy exposure of densely populated areas to nuclear bomb radiation.

Heavy ionizing radiation may actually improve the learning process, at least in rats. Irradiated animals at the University of Nebraska were reported to learn more rapidly and forget more slowly in standard puzzle situations for rats. This appears to be not a true basic improvement in the learning process, but because the injured animals are less subject to incidental distractions.

The world's first pound of the extremely rare element, europium, has been produced at Oak Ridge National Laboratory, Tenn. An extraction process using tributyl phosphate and nitric acid was used to produce 500 grams, the largest known single quantity of this element. Europium will be

used in control rods in atomic power plants.

Yttrium, another rare earth metal, will be available in relatively large quantity, since 150 pounds of its pure oxide is being converted to metal at Ames Laboratory, Ames, Iowa.

A way to mix atomic fuel with molten metal for use in power plants of the future was reported from Argonne National Laboratory, Lemont, Ill. A slurry can be made by suspending uranium dioxide in liquid sodium-potassium alloy.

By using radiation to induce mutations in plants, the AEC reported, scientists at Brookhaven National Laboratory, Upton, N. Y., have produced a high yield wheat that is resistant to one form of wheat rust, a variety of rice with short strong straw to withstand wind damage, and a disease-resistant flax.

Science News Letter, February 11, 1956

Farm tractors have more than doubled in number in the last 10 years.

Questions

BIOCHEMISTRY—How does food eaten affect an animal's brain? p. 89.

☐ ☐ ☐

BIOLOGY—How can sex of unborn humans be determined? p. 85.

☐ ☐ ☐

FORESTRY—What disease of white pines is being successfully beaten? p. 93.

☐ ☐ ☐

GENERAL SCIENCE—What is one authoritative estimate concerning when atomic energy will be used every day by average citizens? p. 84.

☐ ☐ ☐

METALLURGY—How could certain kinds of airplane accidents be avoided? p. 89.

☐ ☐ ☐

SURGERY—Why should walking cones be more generally used? p. 88.

☐ ☐ ☐

Photographs: Cover, Argonne National Laboratory; p. 83, U. S. National Committee for International Geophysical Year; p. 85, London B. Shettles; p. 87, U. S. Army; p. 90, Armed Forces Medical Library; p. 96, Luria Courmand, Inc.

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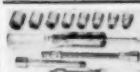
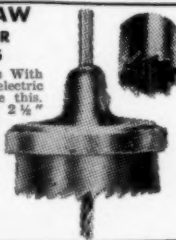
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Science News Letter, February 11, 1956

✿ **REVERSIBLE TEMPLATES** as a set of five are for drawing general layouts or details of any valving and piping system. Made of rigid, non-glare vinyl, there are four 5½" by 9¾" pipe, pipe fitting and valve indication templates and one dimensioning template.

Science News Letter, February 11, 1956

✿ **LABORATORY CRUCIBLE** has a melting point of 3,900 degrees Fahrenheit. Designed for work with molten metals such as magnesium, steel, tin and zinc, as well as with nitric and hydrochloric acids, the crucible is made from zirconium boride 101. It is available in 50- and 100-milliliter size.

Science News Letter, February 11, 1956

✿ **PLASTIC "AQUAPLANE"** is a self-propelled, unsinkable boat made of fiber



glass reinforced plastic, shown in the photograph. Powered by a seven, ten, 12, 15 or 20 hp outboard motor, the 155-pound sport craft can travel at better than 30 knots. The bow-mounted engine automatically shuts off if the rider falls.

Science News Letter, February 11, 1956

✿ **WEATHER FORECASTING GAME** for the junior meteorologist includes a weather book, room thermometer, slate map of the United States and the necessary dials for indicating wind direction, velocity and other factors.

Science News Letter, February 11, 1956

✿ **FISHERMAN'S HITCHES** offer a quick way to switch lures. Made of stainless steel, the hitches are in four sizes and have been tested for 25 pounds fly, 40 pounds spin, 135 pounds casting and 230 pounds heavy duty.

Science News Letter, February 11, 1956

✿ **SAFETY PIN** for baby's diapers consists of two plastic discs with a metal press-lock fastening device. It snaps together and pulls apart, and is available in blue or pink. The new pin is said to eliminate the possibility of its being swallowed by a baby.

Science News Letter, February 11, 1956

✿ **METAL POLISH** for all metals has been imported from Germany. Packaged in a tube, it is described as having an anti-tarnish agent capable of maintaining a mirror-like finish for periods of up to six months.

Science News Letter, February 11, 1956

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Do You Know?

The Pacific states experienced the highest rate of population increase in the U. S. during 1955, about twice the rate for the country as a whole.

Of the 1,600 miles of roads in Honduras, only 20 miles are paved.

Salt was probably the first chemical used in curing meat.

Some 10,000,000 Americans suffer from brain damage of various kinds.

Aluminum is the most plentiful non-ferrous metal in the world.

A new-born seal is about 36 inches long and weighs from 20 to 38 pounds.

Mountain climbing proves the human body can adapt to a deficiency of oxygen once considered fatal.

It is estimated that by the year 2,000 about ten times as much energy will be used throughout the world as was used in 1947.